

# Flashes, Floaters Retinal Tears and Retinal Detachment

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With age the vitreous gel in the vitreous cavity degenerates. The gel is a combination of viscous hyaluronic acid and collagen fibrils. The collagen fibrils are in greatest number adjacent to the retina. The fibrils are more firmly attached to the retina over the optic nerve, macula, retinal vessels, and at the anterior insertion of the retina. As the gel degenerates and liquefies, the collagen fibrils pull away from the retina. This separation of the gel from the retina is known as Posterior Vitreous Detachment (PVD).

The mechanical pulling away of the gel from the retina stimulates the retina and produces light flashes (photopsias). As the collagen fibrils separate from the retina they become visible to the patient and are seen as floaters. Floaters have a variety of appearances to include cobwebs, strings, rings, "bugs", and dots. Usually seeing hundreds of black dots represents bleeding in the eye from either a torn retina or blood vessel.

Although flashes and floaters are usually of no long-term visual consequence, they can be the first sign of retinal tears or retinal detachment. The retina is a delicate structure. Because the vitreous is attached to the retina, it is possible for the vitreous gel to tear the retina (Fig. 1) when it physically pulls away from it during Posterior Vitreous Detachment or PVD.

Retinal holes or tears can lead to separation of the retina from the inside wall of the eye producing a retinal detachment (Fig. 2). When the retina detaches, it separates from part of its nutritional supply coming from the choroidal layer of blood vessels in the wall of the eye. The patient usually first notices loss of peripheral vision. If the retina detaches to include the macula, the patient loses reading

(central) vision.

Everyone will develop a Posterior Vitreous Detachment if they live long enough - usually by 60 to 70 years of age. The prevalence of retinal breaks in U.S. adults is 4-8% based on clinical and autopsy reviews. Not all retinal tears lead to retinal detachments. The incidence of retinal detachments in the general population is 1:10,000. This risk increases to 1:100 to 3:100 after cataract surgery and after YAG laser capsulotomy for secondary cataracts. Near sighted patients are more prone to retinal tears and detachment.<sup>1</sup> New symptomatic retinal tears with minimal surrounding retinal detachment are usually operated with cryo or laser surgery.<sup>2</sup> This produces an adhesion between the retina and the wall of the eye. This acts like a spot weld to prevent retinal detachment.

However, if a retinal detachment occurs, laser and/or cryo surgery will not be work effectively to restore peripheral vision. Other surgical modalities include pneumatic retinopexy, scleral buckle, and vitrectomy surgery.

Pneumatic Retinopexy was first popularized in 1986.<sup>3</sup> The retinal tears have to be located above the 8:00 to 4:00 meridians of the eye (think of a clock face). A gas bubble is injected into the vitreous cavity. The patient's head is positioned so that the bubble rises in the liquid vitreous to tamponade the retinal tear. Then either cryosurgery or laser surgery is used to surround the tear or tears. The patient maintains the specified head position with the gas bubble against the tear for several days until the adhesion biologically glues the retina to the wall of the eye. The eye has a pump mechanism that removes fluid from between the retina and wall of the eye as long as the gas bubble plugs the tear from inside the eye. The long-term success rate of only this operation (73%) is not quite as good as performing a scleral buckle as the initial procedure (82%). However, the combined success rate of Pneumatic Retinopexy and Scleral Buckle is equal to doing an initial Scleral Buckle. The Pneumatic Retinopexy operation offers the advantages of it being an office procedure and having less morbidity with a slightly better visual acuity result as compared to a Scleral Buckle operation.<sup>4</sup>

A Scleral Buckle operation is used for more severe retinal detachments and inferiorly located retinal tears. This is an Outpatient Operating Room procedure. The eyeball is exposed. All retinal tears are localized and receive cryosurgery. A silicone band is placed over the tears such as to indent the wall of the eye to approximate it to seal the retinal tears.<sup>5</sup> This succeeds in 85-95% of uncomplicated primary retinal detachments.

Vitrectomy surgery is reserved for detachments accompanied by vitreous hemorrhage that prevents seeing into the eye appropriately, detachments from tears in the far back portion of the eye, and for detachments associated with significant scar tissue growth on the

Fig. 1

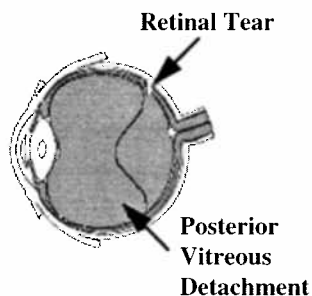
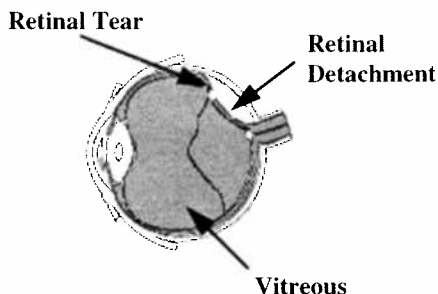


Fig. 2



retina known as Proliferative Vitreoretinopathy (PVR). The vitreous is removed and scar tissue is excised from the retinal surface. The fluid in the vitreous cavity is replaced with a gas bubble that pushes the detached retina against the wall of the eye. Laser surgery surrounds the retinal tears. A scleral buckle helps to seal the tears also. The patient is then placed in a face down position for two to five weeks until aqueous humor gradually the gas bubble. A few patients require silicone oil as a long acting vitreous substitute.<sup>6</sup> Intraoperative perfluorocarbon liquids are also now used as a mechanical liquid tool in selected PVR cases and giant retinal tears.<sup>7</sup> This has dramatically improved surgical ability in these more difficult detachments. With these modalities ophthalmologists in Hawaii can care for all patients with even the most difficult retinal detachments.

Overall, retinal detachment surgery has a 90-95% successful reattachment rate with one or more operations. Unfortunately, final visual acuity cannot be predicted. If the macula is detached, reading vision may never return to normal. New flashes and floater symptoms demand proper examination. It is much better to operate a retinal tear before it has progressed to a detachment with loss of vision.

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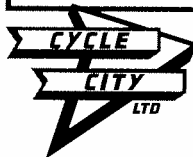
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